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Silvia Secchi

ENVIRONMENTAL CREDIT TRADING: AN OVERVIEW

Environmental credit trading

- Definition of **environmental credit trading**: two parties enter into a voluntary agreement. One party undertakes an activity that provides environmental benefits, in exchange for payment from the other party.

Environmental credit trading

- Two broad categories under which credit trading takes place.
- *Individual to individual*
 - Driven by **self interest, not regulation**
 - France: Perrier-Vittel pays farmers to use less intensive dairy farming techniques to reduce pollution of its springs.
 - Costa Rica: an hydropower plant pays upstream farmers to implement land management practices to reduce soil erosion.
- *Mitigation markets – purely government constructed, regulation driven.*
 - Two types, in common underlying regulation putting a limit on the environmental damage/mandating some level of environmental improvement).
 - **Baseline-and-credit trading**: a buyer not required to meet environmental performance improvements (not regulated) sells credits for environmental improvement to a buyer that is required to make improvements.
 - Watershed credits between water treatment plants and farmers.
 - **Cap-and trade program**: both the buyer and seller of credits are under an obligation to improve their environmental performance.
 - The market for sulfur dioxide emission reduction for coal fired power plants.

Why trade?

- The **fundamental reason** to introduce trading in environmental goods is that markets work well at achieving the allocation of goods and services in the least costly way.
- Only individuals really know what the real cost of an action is. When they operate in a market, they use that knowledge to make a decision. Typically, governments do not have such good information, so when they regulate they will not be able to take into account the differences in costs and will be less efficient.

Trading: an example

- Limiting nitrogen losses on surface water in a watershed.
- The government could ban fall fertilizer applications outright, or it could institute a cap and trade program under which farmers are allocated certain number of permits (rights to discharge N).
- Each farmer knows how costly it would be to eliminate fall fertilizer applications, change type of fertilizer, move to precision applications – even switch crop rotations to reduce nutrient losses.
- If farmers are given permits, they take all these factors into consideration in deciding how many credits to buy/sell.
- It is simply impossible for a centralized agency to know farmers' cost structures very well, so the regulation – however well designed – will not take them all into account and will be inefficient. In a market, however, *the aggregated cost of achieving a given level of environmental protection is minimized.*

Another reason why trading works...

- Markets provide incentives for the adoption and diffusion of cheaper and better pollution control technologies.
- A private company may develop better precision farming technology, for example, so that the farmers adopting it can sell more credits on the market.

If markets are so great, why are they not there already?

Many environmental goods are *public goods* (non-rival, non-exclusive) - property rights are insufficiently defined to attract private investment, and benefits cannot be captured by land owners.

- These goods also involve offsite effects
 - A farmer's tillage choice affects carbon sequestration levels, which in turn affect global climate change. A farmer alone, making profit-based decisions, cannot take into account the impact of his tillage choices on climate.
- Markets for environmental goods often require government involvement, particularly to get started
- *Credit trading can complement traditional approaches* in improving our environment. It can work in conjunction with regulation and financial and technical assistance programs
- The right mix will depend on the specifics of the environmental good. There is no one-size-fits-all solution, and the on-the-ground knowledge and expertise of NRCS personnel is crucial to the development of well functioning markets, and their integration with other programs to improve environmental performance

Basic features of an efficient market

1. There must be "*many*" willing buyers and *sellers*, so that no single buyer and seller has too much control over prices.
 - In practice, this means that the market has to be "big enough", and this will be market-specific.
2. The *ownership of the environmental goods being traded must be clear*.

Basic features of an efficient market

3. The *good must be clearly defined and measurable*.
 - Methodologies to monitor and quantify the good must be robust
 - The permits can be defined on the basis of on-farm practices (inputs) or as changes in the level of the environmental good (output, performance)
 - Input oriented payments work if there is a good correlation between the two measures
 - In the case of practice-based programs, activities need to be converted into a common unit of measurement that relates to their impact on the environmental good . The land owners need to be able to understand how the program obtains these conversions
 - Convert the impact of cover crops, no fall fertilizer application etc. into N load reductions
 - If the activities have different levels of permanence, there needs to be a clear standardized unit of trade that balances between keeping transaction costs low and the need to periodically re-negotiate contracts
 - Conservation tillage and tree planting for carbon sequestration have different time horizons

Basic features of an efficient market

4. *Prices must be known.*

5. *Transaction costs must be low*, otherwise the markets will not work efficiently.

- ▣ The small scale of agricultural producers compared to the size of some potential markets means that some entities may work as aggregators and bundle up activities/credits from farmers and sell them to the market.
- This is likely to be the case for carbon, for example, because that market is global in scope.

6. *There must be no barriers to entry*, which is linked to point 1.

The goal is to improve environmental quality

- The mitigation markets you will often deal with will be baseline-and-credit markets. The challenge in this type of markets is to obtain *real improvement of environmental quality*.
- The reason this is a challenge is that the buyers (often point sources) are allocated a regulatory cap of emissions/pollution, which they can achieve by improving their environmental performance or buying credits, but the farmers (non-point sources) are not subject to a cap.
 - The farmers are not subject to a specified baseline, so pollution reductions must be credited relative to an unobservable hypothetical - what the farmer would have emitted in the absence of the regulation.

The goal is to improve environmental quality

- This creates the possibility for paper trades, where a regulated source is credited for an emissions reduction by an unregulated source that would have taken place anyway. This is paying money for nothing, or lack of additionality.
- The solution is to identify activities for which the non-point sources can receive credit that:
 - *will truly be additional* to what they were doing/would be doing
 - *will improve environmental quality*.
- This is one of the reasons why the selection of activities to be included in the market, and the definition of a common unit of exchange or currency is the most important thing to get right or not terribly wrong.

Rewarding the good actors

- “Rewarding the good actors” is a common concern in agricultural conservation.
 - In practice-based programs, you can base payments on the level (or existence) of a particular practice, or on improvements in practices or performance. For practice-based programs, this decision comes down to paying for new practices or for all preferred practices (regardless of when they were adopted).
 - In performance-based programs, all farms that have achieved a relatively low (“good”) level of, say, soil erosion can receive a payment or only the producers that reduce erosion (“improve performance”) on their fields can receive a payment.

Rewarding the good actors

- You can reward the good actors in a constructed market too.
 - In practice-based programs, you can define the baseline from which credits are determined as one in which everybody is granted the right to pollute.
 - Whether you are actually polluting or not does not matter in determining the initial allocation.
 - In performance-based markets, all farms can be treated as zero emitters in the baseline and any reduction in soil erosion can result in a credit being incurred.
 - *This is clearly inefficient.*
- This is “money for nothing”: paying for adoption of practices that would have been adopted anyway (or had been adopted before).
- This goes back to the goal of the trading mechanism. If the goal is to improve environmental quality, we should not reward good actors *except to avoid strategic behavior*.

Leakage or spillage

- The inadvertent displacement of activities damaging environmental service provision to areas outside the geographical zone of the program.
- What is the goal of the credit trading, again.
- A classic case: the Conservation Reserve Program
 - CRP enrollment reduced crop production levels and improved environmental quality;
 - The reduction in acreage increased crop prices;
 - Which in turn pushed for the conversion of pasture or other fallow acres into cultivated cropland thereby reducing prices and impacting the environment.
- What we care about is the net impact when we are in equilibrium.
- Be mindful of *unintended consequences*.

Challenges

- The devil is in the details and it is expensive...
- Monitoring on a practice and performance basis is needed;
- Effective penalties – actors will look at the probability of being caught \times amount of the fine.
- Define system boundaries to minimize leakage.
- Define realistic and effective units of trade.